Recommendations

To achieve our nation's economic goals and meet our aspirations for the environment, natural gas will play a vital role in a balanced energy future. Stable and secure long-term supply, a balanced fuel portfolio, and reasonable costs will be enabled by a comprehensive solution composed of key actions facilitated by public policy at all levels of government. Key recommendations to assure long-term supply and a balanced fuel portfolio at reasonable cost fall into four strategic themes highlighted and summarized here:

- **Improve demand flexibility and efficiency**
  - Encourage increased efficiency and conservation through market-oriented initiatives and consumer education
  - Increase industrial and power generation capability to utilize alternate fuels
- **Increase supply diversity**
  - Increase access and reduce permitting impediments to development of lower-48 natural gas resources
  - Enact enabling legislation in 2003 for an Alaska gas pipeline
  - Process LNG project permit applications within one year
- **Sustain and enhance natural gas infrastructure**
  - Provide regulatory certainty by maintaining a consistent cost-recovery and contracting environment and remove regulatory barriers to long-term capacity contracting and cost recovery of collaborative research
  - Permit projects within a one-year period using a "Joint Agency Review Process"
- **Promote efficiency of natural gas markets**
  - Improve transparency of price reporting
  - Expand and enhance natural gas market data collection and reporting.

North American natural gas resources have historically provided stable supplies, and will continue to supply the vast majority of the continent's needs. However, future needs will not be met by continued development of these resources alone, and a significant share of demand will be met with Arctic and global LNG resources. Natural gas provides about 25% of the continent's total energy needs and will be one of the vehicles for continued air quality improvements. However, as part of the balance between supply and demand, flexibility in current fuel use and diversity in future industrial and power generation fuels will be required. Following are details of NPC recommendations.

RECOMMENDATION 1: IMPROVE DEMAND FLEXIBILITY AND EFFICIENCY

Natural gas is a critical source of energy and raw material, permeating all sectors of the economy. Each sector of the economy can make contributions to using natural gas resources more efficiently.

The changes in demand require involvement of each consumer segment and can be broadly characterized as:

- Energy efficiency and conservation
- Fuel switching and fuel diversity.

In the very near-term, reducing demand is the primary means to keep the market in balance because of the lead times required to bring new supply to market. While current market forces encourage conservation among all consumers and fuel switching for large customers who have that capability, proactive government policy can augment market forces by educating the public and assisting low-income households. Key recommendations are summarized below.

Encourage Increased Efficiency and Conservation through Market-Oriented Initiatives and Consumer Education

Energy efficiency is most effectively achieved in the marketplace, and can be accelerated by effective utilization of power generation capacity, deployment of high-efficiency distributed energy (including cogeneration which captures waste heat for energy), updating building codes and equipment standards reflecting current technology and relevant life-cycle cost analyses, promoting high-efficiency consumer products including building materials and Energy Star appliances, encouraging energy control technology including "smart" controls, and facilitating consumer responsiveness through efficient price signals.

- **Educate consumers.** All levels of government should collaborate with non-governmental organizations to enhance and expand public education programs for energy conservation, efficiency, and weatherization.
- **Improve conservation programs.** DOE should identify best practices utilized by states for the low-income weatherization programs and encourage adoption of such practices nationwide.
- **Review and upgrade efficiency standards.** DOE, State Energy Offices, and other responsible state and local officials should review the various building and appliance standards which were previously adopted to ensure decisions reached under cost / benefit relationships are valid under potentially higher energy prices.
- **Provide market price signals to consumers to facilitate efficient gas use.** FERC, Regional Transmission Organization (RTOs), and state utility commissions should

facilitate adoption of market-based mechanisms and/or rate regimes, coupled with metering and information technology to provide consumers with gas and power market price signals to allow them to make efficient decisions for their energy consumption.

- **Improve efficiency of gas consumption by resolving the North American wholesale power market structure.** FERC and the states/provinces, and if necessary congressional legislation, should improve wholesale electricity competition in the United States, Canada, and interconnected areas of Northern Mexico. FERC should mitigate rate and capacity issues at the seams between adjoining RTOs to maximize efficient energy flows between market areas.

- **Remove regulatory and rate-structure incentives to inefficient fuel use.** FERC, RTOs, and state regulators should ensure central dispatch authority rules, procedures and, where applicable, cost-recovery mechanisms, require dispatch of the most efficient generating units while meeting lowest cost and system reliability requirements.

- **Provide industrial cogeneration facilities with access to markets.** Congress, FERC, RTOs and, where applicable, state regulators should ensure that laws, regulations, and market designs provide industrial applications of cogeneration with either access to competitive markets or market-based pricing consistent with the regulatory structure where the cogeneration facility is located.

- **Remove barriers to energy efficiency from New Source Review**. Remove barriers to investment in energy efficiency improvements, and investments in new technologies and modernization of powerplants and manufacturing facilities by implementing reforms to New Source Review such as those proposed by the U.S. Environmental Protection Agency in June 2002.

Increase Industrial and Power Generation Capability to Utilize Alternate Fuels

Natural gas has become an integral fuel for industrial consumers and power generators due to a range of factors, including its environmental benefits, and these consumers should continue to be allowed to choose natural gas to derive these benefits. However, the greatest consumer benefit will be derived from market-based competition among alternatives, while achieving acceptable environmental performance. The ability of a customer to switch fuels serves to buffer short-term pressures on the supply/demand balance and is an effective gas demand peak shaving strategy that should reduce upward price volatility. Increasing fuel diversity, the installation of new industrial or generation capacity using a fuel other than natural gas, serves to reduce greater gas consumption over the life of the new capacity. Most facilities that would consider installing non-gas fueled capacity tend to be large and energy intensive. Therefore, increasing fuel diversity will have a large cumulative effect on natural gas consumption over the period of this study.

- **Provide certainty of air regulations to create a clear investment setting for industrial consumers and power generators, while maintaining the nation's commitment to improvements in air quality.**

- **Provide certainty of Clean Air Act provisions.** Congress should pass legislation providing certainty around Clean Air Act provisions for sulfur oxides (SOx), nitrogen oxides (NOx), mercury, and other criteria pollutants. These provisions should recognize the overlapping benefits of multiple control technologies. The current uncertainty in air quality rules and regulations is the key impediment to investment in, and continued operation of, industrial applications and power generation facilities using fuels other than natural gas. Congress should ensure that such legislation encourages emission-trading programs as a key compliance strategy for any emissions that are limited by regulation.

- **Propose reasonable, flexible mercury regulations.** The Environmental Protection Agency's December 2003 proposed mercury regulations should provide adequate flexibility to meet proposed standards. These regulations should acknowledge the reductions that will be achieved by way of other future compliance actions for SOx and NOx emissions, and provide phase-in timeframes that consider demand pressure on natural gas.

- **Reduce barriers to alternate fuels by New Source Review processes.** Performance-based regulations should meet the emission limits required without limitations on equipment used or fuel choices. State and federal regulators should ensure that New Source Review processes, and New Source Performance Standards in general, do not preclude technologies and fuels other than natural gas when the desired environmental efficiency can be achieved.

- **Expedite hydroelectric and nuclear power plant relicensing processes.** FERC, the Nuclear Regulatory Commission, and other relevant federal, state, regional, and local authorities should expedite relicensing processes for hydroelectric and nuclear power generation facilities. These authorities should fully consider the increased future requirements for natural gas-based generation in the affected regions that could arise from conditions of approval or denial of relicensing. In the case of denial, adequate phase-in time specific to the fuel type of replacement resources should be provided to bring alternative generation resources onto the grid to replace non-renewed facilities.

- **Take action at the state level to allow fuel flexibility**

  - **Ensure alternate fuel considerations in Integrated Resource Planning.** Where Integrated Resource Planning is conducted at the state regulatory agency level, state commissions should require adequate cost / benefit analysis of adding alternate fuel capability to gas only fired capacity.

  - **Allow regulatory rate recovery of switching costs.** State PUCs should provide rate treatment to recover fuel costs and increased fuel operating & maintenance costs when units switch to less expensive alternate fuels as matter of practice and policy, since the fuel switching either directly, or indirectly benefits ratepayers by reducing gas price, and / or volatility through fuel switching.

- **Support fuel backup.** State executive agencies should ensure policies of state permitting agencies encourage liquid fuel back up for gas-fired power generation, and encourage a balanced portfolio of fuel choices in power generation and industrial applications.

- **Incorporate fuel-switching considerations in power market structures.** RTOs, Independent System Operators, and tight Power Pools should ensure bidding processes and cost caps provide appropriate price signals to generation units capable of fuel switching. FERC should ensure that wholesale power markets, containing any capacity components, should have market rules facilitating pricing of alternate fuel capability.

Additional Demand Considerations

There are additional actions and policy initiatives that could be undertaken to create a more flexible and efficient consumer environment for natural gas, while assuring environmental goals are achieved.

- **Permit Reviews.** State environmental agencies, in consultation with the U.S. Environmental Protection Agency, should review existing alternate fuel permits, and opportunities for peak-load reduction during non-ozone season. All new permits should have maximum flexibility to use alternate fuels during all seasons, recognizing the ozone season may require some additional limitations. During ozone season, cap and trade systems should govern the economic choices regarding fuel choice to the maximum extent possible.

- **Forums to Address Siting Obstacles.** With respect to coordination among multiple levels of government, federal agencies should consider facilitating forums to address obstacles to constructing new power generation and industrial capacity. Participants would include the relevant federal, state, and local siting authorities, as well as plant developers and operators, industrial consumers, environmental non-governmental organizations, fuel suppliers, and the public. The objective of these forums would be to address with stakeholders the impact of siting decisions on natural gas markets.

- **Potential Limits on Carbon Dioxide Emissions.** Ongoing policy debates include discussion of carbon reduction, including potential curbs on CO_2 emissions. Many actions would constitute the market's response to such limitations, including shutdown and/or re-configuration of industrial processes, additional emissions controls including carbon sequestration or the shifting of manufacturing to other countries.

  Natural gas has lower CO_2 emissions than other carbon-based fuels. Therefore, natural gas combustion technologies are likely to be a substantial aspect of the market's response to limitations on CO_2 emissions in industrial processes and power generation. The most significant impact of CO_2 emission curbs would likely be restrictions in operation of much of the coal-fired power generation, since coal-combustion processes tend to emit the highest levels of CO_2. Depending on the level of emission restrictions, the requirements for natural gas in power generation alone could increase substantially.

Alternatives to natural gas would be additional nuclear power and/or coal-fired generation employing carbon sequestration technologies that are unproven on a large scale. Renewable electric generation capacity is likely to play a growing role in the future, but has not demonstrated the ability to have a large impact.

This study tested the impacts on natural gas demand and the resulting market prices, by performing sensitivity analyses; the impact on gas demand could be significant, as discussed elsewhere in this study, depending on the degree to which carbon intensity might be reduced. Natural gas consumption for power generation would clearly increase under any CO_2 reduction scheme during the time frame of this study, placing enormous demand pressure on natural gas. This would likely lead to much higher natural gas prices and industrial demand destruction.

- **DOE Research.** With respect to government research, the NPC is supportive of DOE research where it complements privately funded research efforts. DOE and state energy offices should continue to support research and commercialization of wind, solar, biomass, and other renewable generation technologies. DOE should continue to support government and industry partnership in funding improvements such as advanced turbines, clean coal, carbon sequestration, distributed generation and renewable technologies, as well as efficient use of natural gas should also be supported.

RECOMMENDATION 2: INCREASE SUPPLY DIVERSITY

The lower-48 states currently supply about 80% of the natural gas consumed in the United States. Imports, primarily from Canada, provide about 20%, with LNG currently accounting for about 1% of total U.S. demand. While North America has very sizable natural gas resources, supplies from them are unlikely to meet projected demand growth. As a result, new sources of supply must enter the market, and government policies must remove impediments that inhibit delivery of the additional supplies.

These new supply sources can be broadly characterized as:

- Lower-48 resources that are currently restricted or face permitting impediments
- North American Arctic gas
- Increased global LNG imports.

Support for all new supply sources is required to meet the expected growth in natural gas demand. The recommended actions to facilitate development of these new supply sources are summarized below.

Increase Access and Reduce Permitting Impediments to Development of Lower-48 Natural Gas Resources

Land-use policies of federal, state, and local governments have not kept pace with technological advances that allow for exploration and production while protecting environmentally sensitive areas by reducing the number and size of onshore drilling sites and offshore production facilities.

In addition, the federal government has continued to set federal lands off-limits to development through legislation, executive orders, and regulatory and administrative decisions. Moreover, an increasingly complex and costly maze of statutory and regulatory requirements effectively places a significant portion of additional lands off-limits to development, even though they are technically available for leasing.

The trend toward increased land restrictions and set-asides has been especially troublesome in the Rocky Mountain area. The NPC estimates that 25% of the remaining technical resource in the lower-48 underlies the Rocky Mountain area, and that 29% (70 TCF) is currently off-limits to exploration and development, either due to statutory leasing withdrawals or to the cumulative effect of conditions of approval associated with exploration and development activities. Set asides are common in the OCS, where virtually the entirety of the Atlantic and Pacific coasts are off limits due to executive order and most of the Eastern Gulf of Mexico is off limits due to administrative decisions. Most recently, further restrictions were set in place when the original boundaries of the 2001 OCS Lease Sale 181 were reduced to include only 25% of the originally proposed acreage.

Experience shows that natural gas development in areas similar to those restricted in the United States can be undertaken with appropriate environmental safeguards. The use of state-of-the-art drilling and production technologies plays a key role in those developments. Mountainous areas of western Canada, which face fewer federal and provincial barriers to access, have been successfully developed without compromising the environment. The OCS of Eastern Canada is being successfully and safely developed, and the governments of British Columbia and Canada are reviewing the potential to open offshore Western Canada for exploration and development.

The NPC recognizes and supports the obligations of state and federal governments to protect endangered species, historical resources, and the environment. At the same time, the NPC sees the need for government to balance those considerations with the need to increase supplies of natural gas.

The following public-policy recommendations are designed to foster balance by streamlining processes, improving communications, enhancing cooperation, acknowledging proven technological advances, and reducing unnecessary costs and delays for the industry and the various government agencies and non-governmental organizations involved with addressing these issues. The recommendations are segregated into onshore and offshore.

Onshore – Increase Access (Excluding Wilderness Areas and National Parks) and Reduce Permitting Costs/Delays 50% over Five Years

The following recommendations will reduce permitting response time by streamlining processes, instituting performance metrics, clarifying statutory authority, and ensuring adequate agency resourcing.

- **Improve government land-use planning.** Governing agencies should use Reasonable Foreseeable Development scenarios as planning tools rather than to establish surface disturbance limitations. Land use planning and project monitoring should be a priority in order to facilitate timely plan revisions and project permitting.

- **Expedite leasing of nominated and expired tracts.** The federal government should expedite the leasing of nominated tracts and expired leases. This can be facilitated by use of existing planning documents and reducing requirements for extraneous environmental analysis where appropriate.

- **Expand use of categorical exclusions or sundry notices as alternatives to processes imposed by the National Environmental Policy Act (NEPA).** Every surface disturbance activity requires environmental analysis prior to permitting. NEPA costs and delays can be reduced through the use of categorical exclusions or sundry notices instead of environmental assessments for minimal disturbance activities and through improvement of data sharing and coordination by state and federal land management agencies.

- **Streamline and expedite permitting processes.** The permitting process should be streamlined by establishing performance goals for each office, reducing on-site inspections, increasing use of sundry notices in lieu of Application for Permit to Drill (APD), and using dedicated teams to support high workload field offices. This should be continuously monitored and refined by efficient and comprehensive reporting, benchmarking, and best practices programs within the Bureau of Land Management and Forest Service, etc.

- **Establish cultural resource report standards and eliminate duplicate survey requirements.** This is the most frequent cause of delays and expense for APD and right-of-way approvals. Significant cost reductions and time savings can be realized by eliminating duplicate surveys, developing clear standards for determining site significance, and establish clear cultural report review requirements among governing agencies.

- **Establish qualification requirements and technical review procedures for nomination of endangered species.** There currently exists no qualification requirements to nominate a species for listing, and once nominated, these species are given the same protection as listed endangered species. This results in delays to land management planning and project permitting until a ruling on the nominated species. It is recommended that this process be changed to establish qualification requirements and technical review procedures to prevent such unwarranted delays.

- **Fund and staff federal agencies at levels, and in manners, appropriate for timely performance of responsibilities.** Federal land management agencies need to ensure adequate resources to efficiently handle responsibilities for updating land use plans, administering the NEPA process, processing lease and permit applications, and resolving appeals and protests in a timely manner. The Bureau of Land Management should consider the formation of dedicated teams to assist field offices with high permitting workloads.

Offshore – Lift Moratoria on Selected Areas of the Federal OCS by 2005

Resources in the Eastern Gulf of Mexico and off the Atlantic and Pacific coasts are currently not accessible due to leasing moratoria. The following recommendations are proposed for these stranded resources:

- **Lift, in a phased manner, moratoria on selected OCS areas having high resource-bearing potential.** Federal and coastal state governments, working with industry and other stakeholders, should develop a plan to identify current moratoria areas of the Eastern Gulf of Mexico and Atlantic and Pacific Coasts containing a high resource potential, with a view toward lifting the moratoria in a phased approach beginning in 2005.

- **Update resource estimates for MMS-administered areas.** The federal government (Minerals Management Service) should coordinate the development of updated estimates of natural gas resources underlying the OCS submerged lands and identify the data gathering activities that could be undertaken to improve the technical support for this estimate.

Currently accessible areas of the Gulf of Mexico provide the United States with 23% of its natural gas supply. The following recommendations are proposed to ensure the continued supply of this critical resource:

- **Ensure continued access to those OCS areas identified in the 2002-2007 5-Year Leasing Program.**

- **Ensure that Marine Protected Areas are meeting their intended purposes.** Regulatory requirements for protection of marine species should be based on the best available scientific analysis to avoid inappropriate or unnecessary action having uncertain benefit to the intended species. Lease stipulations and operational measures should be practical, cost effective, and aimed to achieve minimal delays in ongoing operations.

- **Require federal and state joint development of Coastal Zone Management (CZM) Plans.** Ensure that federal and state authorities improve coordinated development and review of CZM Plans to understand the impact on federally authorized and regulated OCS activities. If a state alleges that a proposed activity is inconsistent with its CZM Plan, it should be required to specifically detail the expected effects, demonstrate why mitigation is not possible, and identify the best available scientific information and models which show that each of the effects are “reasonably foreseeable”. The Secretary

of Commerce should not approve state CZM Plans if such implementation would effectively ban or unreasonably constrain an entire class of federally authorized and regulated activities, such as gas drilling, production, and transportation.

Enact Enabling Legislation in 2003 for an Alaska Gas Pipeline

The Arctic regions of Alaska and Northwestern Canada contain significant volumes of discovered gas resources, which have the potential to supply North America with 8% of projected demand in 2015. While these resources were discovered over 30 years ago, several hurdles (costs, permitting, state fiscal certainty, market risks) have prevented their development. Currently pending enabling legislation, which at a minimum would provide regulatory certainty, creates an opportunity to take action and to ensure the legislative requirements of such a massive infrastructure project are met.

The projections in this study are generally favorable for development of Arctic resources. Based on these projections, the NPC has assumed that both the Mackenzie Delta pipeline and the Alaska pipeline are constructed in a "success case" time period, with Mackenzie gas initiating production in 2009 and Alaska in 2013. The timetable for Alaska gas is very aggressive, and can only be met with prompt government action.

Infrastructure projects of this magnitude require the following:

- **Congress should enact enabling legislation in 2003 for an Alaska gas pipeline.** Passage of this legislation in 2003 is required to support deliveries of this gas to the market in 2013. Council members and Prudhoe Bay producers agree that Congress should immediately enact legislation that provides regulatory certainty to such a project.

- **Canadian agencies should develop and implement a timely regulatory process.** The various governments in Canada (federal, territorial, provincial) and the First Nations should continue to work cooperatively to develop and implement a timely regulatory process. An efficient process must be in place in early 2004 to support a 2009 Mackenzie gas project start-up and a 2013 Alaska gas pipeline project start-up.

- **Alaska needs to provide fiscal certainty for the project.** The state of Alaska should provide fiscal certainty to project sponsors in a manner that is simple, clear, not subject to change, and that can improve project competitiveness. Such action by the Alaska legislature in 2004 is required to support a 2013 project start-up.

- **Governments should refrain from potentially project-threatening actions.** Governments should avoid imposing mandates or additional restrictions that could increase costs and make it more difficult for a project to become commercially viable.

- **Infrastructure improvements incidental to Alaska gas pipeline construction must be planned in a timely and coordinated manner.** The U.S. and Canadian governments – federal, state, provincial, and territorial – should study and/or consult with one another and industry participants and affected communities to assess contemplated infrastructure

improvements in support of Arctic gas development in advance of the time when these improvements are needed.

Process LNG Project Permit Applications Within One Year

The North American resource base has met the natural gas demands of Canada, Mexico, and the United States to date. However, this is not expected to continue and increased imports of LNG will be required to meet growing demand. LNG provides access to the global supply of natural gas, which has been estimated to contain over 30 times the resource volume of North America. Advances in liquefaction and transportation technologies have driven down the unit cost of LNG by 30% over the past decade and LNG is now viewed as cost competitive with domestic supplies. To meet future demand, the NPC is projecting LNG imports will grow to become 10-15% of the U.S. natural gas supply by 2020. This will require the construction of seven new regasification terminals and expansions of three of the four existing terminals.

This aggressive outlook for LNG import terminal construction will require streamlined permitting and construction to achieve the projected buildup. Expediting the approval process throughout all agencies (federal, state, and local) is critical to overcome the many obstacles that may surface, including local opposition. Leveraging off the recent positive shifts by FERC (positive changes on regulatory process, active leadership role in recent reactivation of Cove Point and Elba Island, and implementation of Memorandums of Understanding [MOUs] among federal agencies working together) and changes made to regulatory policies in late 2002 governing both onshore and offshore LNG import terminals, will provide a springboard for impacting positive changes down through the local level. The goal of the following recommendations is to reduce the time required for LNG facility permitting to one year.

- **Agencies must coordinate and streamline their permitting activities and clarify positions on new terminal construction and operation.** Project sponsors currently face multiple, often-competing state and local reviews that lead to permitting delays. A coordinated effort among federal, state, and local agencies led by FERC would reduce permitting lead time. Similarly, streamlining the permitting process by sharing data and findings, holding concurrent reviews, and setting review deadlines would provide greater certainty to the overall permitting process. FERC should further clarify its policy statement on new terminals so as to be consistent with corresponding regulations under the Deep Water Port Act, including timing for the NEPA review process and commercial terms and conditions related to capacity rights.

- **Fund and staff regulatory agencies at levels necessary to meet permitting and regulatory needs in a timely manner.** The expected increase in the number of terminal applications will require higher levels of government support (federal, state, and local) to process and avoid delays. Additional agency funding/staffing will also be required once these new terminals become operational, particularly to support the large increase in LNG tanker traffic.

- **Update natural gas interchangeability standards.** Standards for natural gas interchangeability in combustion equipment were established in the 1950s. The

introduction of large volumes of regasified LNG into the U.S. supply mix requires a re-evaluation of these standards. FERC and DOE should champion the new standards effort to allow a broader range of LNG imports. This should be conducted with participation from LDCs, LNG purchasers, process gas users, and original equipment manufacturers (OEMs). DOE should fund research with these parties in support of this initiative.

- **Undertake public education surrounding LNG.** The public knowledge of LNG is poor, as demonstrated by perceptions of safety and security risks. These perceptions are contributing to the public opposition to new terminal construction and jeopardizing the ability to grow this required supply source. Industry advocacy has begun, but a more aggressive/coordinated effort involving the DOE and non-industry third parties is required. Emphasis should focus on understandings, safety, historical performance, and the critical role that LNG can play in the future energy supply.

- **LNG industry standards should be reviewed and revised if necessary.** In order to promote the highest safety and security standards and maintain the LNG industry's safety record established over the past forty years of operations, FERC, the Coast Guard, and the U.S. Department of Transportation should undertake the continuous review and adoption of industry standards for the design and construction of LNG facilities, using internationally proven technologies and best practices.

Additional Supply Considerations

There are additional actions and policy initiatives that could be undertaken to potentially enhance supply sources. Among those are the role played by tax and other fiscal incentives or packages, and the desirability of additional government-sponsored research spending.

Two strongly held views of fiscal incentives emerged during the study team discussions. Supporters of such incentives believe additional production would result from pursuit of marginal opportunities and/or high cost supply alternatives, helping to ease the tight supply/demand balance. Others believe market forces are and will be sufficient to stimulate additional investment without the need for tax-related incentives or subsidies. Potential fiscal incentives such as tax credits for nonconventional resource development, low-Btu gas, stripper oil well and deep gas drilling incentives, and an Alaska pipeline fiscal package were discussed, but the NPC makes no recommendation in this regard.

With respect to government research, the NPC is supportive of a role for DOE in upstream research, particularly where it complements privately funded research efforts. DOE's natural gas research program has a significant role in technical studies and related work that support public policy decision-making regarding natural gas supply. DOE currently spends about $50 million per year on jointly sponsored natural gas technology research. This represents 53% of the funding for oil and gas research, but only 9% of the funds directed at fossil energy programs in total. The NPC believes DOE should evaluate whether this level of funding is appropriate in relation to other DOE programs in light of the increasing challenges facing natural gas. Further discussion of this issue is included in the Technology Section of the Supply Task Group report.

RECOMMENDATION 3: SUSTAIN AND ENHANCE NATURAL GAS INFRASTRUCTURE

Although the United States and Canada have an extensive pipeline, storage, and distribution network, additional infrastructure and increased maintenance will be required to meet the future needs of the natural gas market. The recommended actions listed below are required to ensure efficient pipeline, storage, and distribution systems.

Federal and State Regulators Should Provide Regulatory Certainty by Maintaining a Consistent Cost Recovery and Contracting Environment Wherein the Roles and Rules are Clearly Identified and Not Changing.

Regulators must recognize that aging infrastructure will need to be continuously maintained and upgraded to meet increasing throughput demand over the study period. They must also recognize that large investments will be required for the construction of new infrastructure. To make the kinds of investments that will be required, operators and customers need a stable investment climate and distinguishable risk/reward opportunities. Changes to underlying regulatory policy, after long-term investments are made, increase regulatory and investment risk for both the investor and customers.

Complete Permit Reviews of Major Infrastructure Projects within a One-Year Period Using a "Joint Agency Review Process." Projects that Connect Incremental Supply and Eliminate Market Imbalances Should Be the Highest Priority and Be Expedited.

Where available supply is constrained, FERC should expedite timely infrastructure project approvals that will help mitigate the current supply/demand imbalance. Longer term, new project reviews should be expedited via continuing enhancement and increased participation in a Joint Agency Review Process, similar to that which FERC has utilized recently. A Joint Agency Review would require the up-front involvement by all interested/concerned parties including appropriate jurisdictional agencies. This will allow the decision process to proceed to approval and implementation more accurately, more timely, and at lower overall cost. The final FERC record should resolve all conflicts. The areas of greatest concern in this regard are requirements of the U.S. Army Corps of Engineers, Coastal Zone Management Act, and Section 401 of the Clean Water Act, all of which could hinder the orderly implementation of FERC certificates. This process must also assure that a project, which has used and successfully exited this process, may proceed per the direction received and will not be delayed by non-participating parties or other external regulatory standards or processes. This suggestion is a more-specific rendering of the 1999 NPC study's fifth recommendation: "Streamline processes that impact gas development." The NPC supports legislation that accomplishes the "Joint Agency Review Process" as described above. Regulators at federal, state, and local levels, with cooperation of all participating parties, should establish processes and timelines that would complete the regulatory review and approval process within 12 months of filing.

Regulatory Policies Should Address the Barriers to Long-Term, Firm Contracts for Entities Providing Service to Human Needs Customers.

Many LDCs will not enter into long-term contracts in today's market out of fear that regulators may subsequently deem them imprudent in the future. Similarly, power producers, especially those that provide peaking service, are reluctant to contract for firm pipeline service because charges for firm service cannot be economically justified in power sales. As discussed in "Finding 9" of this report, this practice is impairing the investment in infrastructure. The result is that regulatory practices that limit long-term contracts inhibit efficient markets and discourage the development and enhancement of pipeline infrastructure. The regulatory process must allow markets to transmit the correct price signals and enable market participants to respond appropriately. Regulators should encourage, at all levels of regulation, policies that endorse the principles of reliability and availability of the natural gas commodity. All regulatory bodies should recognize the importance of long-term, firm capacity contracts for entities providing service to human needs customers and remove impediments for parties to enter into such contracts.

FERC Should Allow Operators to Configure Transportation and Storage Infrastructure and Related Tariff Services to Meet Changing Market Demand Profiles.

At the interstate level, FERC should continue to allow and expand flexibility in tariff rate and service offerings and continue to allow market-based rates for storage service where markets are shown to be competitive so that all parties can more accurately value services and make prudent contracting decisions. To ensure that existing and future transmission, distribution, and storage facilities can be adapted to meet the significantly varying load profiles of increased gas-fired generation, FERC and state regulators need to allow and encourage operators to optimize existing and proposed pipeline and storage facilities. In some cases, this will require a significantly more flexible facilities design based upon peak hourly flow requirements, i.e., a modification to existing facilities to provide for optimizing storage injections in off-peak hours or in shoulder months.

Regulators Should Encourage Collaborative Research into More Efficient and Less Expensive Infrastructure Options.

Funding for collaborative industry research and development is in the process of switching from a national tariff surcharge-funded basis to voluntary funding. Because of the benefits of reduced costs, system reliability, integrity, safety and performance, DOE should continue funding for collaborative research. Regulators need to encourage and remove impediments regarding cost recovery of prudently incurred R&D expenses by the operators who fund necessary collaborative infrastructure research.

RECOMMENDATION 4: PROMOTE EFFICIENCY OF NATURAL GAS MARKETS

North American natural gas markets are relatively efficient and effective but can be improved. Government should allow market forces to work in addressing the efficiency of markets, particularly as related to liquidity. Recommendations to improve the market's efficiency and effectiveness are summarized below.

Improve Transparency of Price Reporting

Federal and state regulators should support transparency in market transactions by encouraging market participants to report transactions voluntarily to price reporting services. The Council recognizes and supports the FERC's ongoing efforts to improve market transparency and voluntary price reporting.

Expand and Enhance Natural Gas Market Data Collection and Reporting

- DOE's Energy Information Administration should coordinate efforts with state and other federal agencies (MMS) to improve data-collecting processes such that accurate monthly production and consumption data are available within three months.

- DOE/EIA should extend the weekly natural gas storage survey to encompass all storage fields to ensure adequate data necessary to analyze the changing nature of peak demands in winter and power-driven demand in the summer. The current survey method is predicated on reservoir size and omits too many salt dome facilities with their high cycling capability.

- DOE/EIA should reduce the lag in their reported natural gas data series by one month, with a target of storage data one month in arrears and two months for supply and demand data. Involvement of the MMS to provide timely production data is critical given the key role Gulf of Mexico production plays in the total U.S. supply.

STEWARDSHIP OF RECOMMENDATIONS

In order to monitor the progress of implementing the NPC study recommendations, it is proposed that the DOE lead a workshop by May 2004 with government stakeholders and industry representatives. This workshop would review the steps taken for each of the study recommendations and identify additional actions required to achieve the objectives of the study.

It is also proposed that the DOE lead a workshop by year-end 2004 to review actual supply and demand performance and compare with the study outlook. This workshop would highlight any performance deviations from the study projections and identify potential implications for any such changes.

FUTURE WORK AND STUDIES

The NPC study was a comprehensive analytical review of the North American natural gas market, including detailed assessments of supply sources, demand outlooks, and infrastructure requirements. While conducting the study, opportunities for additional activities were identified that could build on the study analysis and position the NPC in the event another major study of North American natural gas is undertaken. Areas for future work include the following.

Resource Base Assessment

- **Rockies Nonconventional Assessment.** There currently exist significant differences between published assessments of the Rockies nonconventional resource. This is the region of the lower-48 states with the largest remaining resource potential and also the largest range of uncertainty. It is proposed that a study be initiated in 2004, involving the DOE, USGS, and industry, to better understand the differences in assessments and see if a more consistent assessment can be developed.

- **Resource Assessment Methodology.** Resource assessments are conducted by many organizations using various methodologies. The resource is generally categorized as proved reserves, future appreciation of the proved reserves in producing fields, and undiscovered resource potential. It is proposed that a study be initiated in 2004, involving the DOE, USGS, MMS, and industry to improve the understanding of the various methodologies with an objective of establishing a preferred approach for future assessments. This would include methodologies for assessing both the technical and commercial resource base.

- **Resource Base Collaboration.** The USGS and MMS conduct periodic assessments of the U.S. resource base. During development of the NPC study resource base, the benefits of industry and government collaborating on such assessments was a key learning and it is proposed that such collaborations continue for future updates to improve alignment. In addition, since the last complete assessment of the U.S. resource base by the USGS is from 1995, it is suggested that the USGS establish a new comprehensive reference assessment utilizing the recent regional updates.

- **DOE/EIA Energy Outlooks.** The DOE's EIA conducts annual energy outlooks for the United States, utilizing a methodology with common components to the NPC study. It is proposed that appropriate findings from the NPC study be incorporated into future annual energy outlooks to improve alignment of outlooks. Initial collaboration is currently underway and is expected to continue past the completion of the study.

Econometric Modeling Efforts

As part of the study, a modeling team was created to construct a comprehensive dynamic equilibrium model of the North American natural gas and power markets. This work advanced the NPC's ability to model the natural gas market. To build on these efforts, the following are proposed:

- **Model Availability.** Work is expected to continue by the modeling team beyond the completion of the study to finalize the modeling effort and to make the model available to NPC members and potentially the DOE if desired.

- **Data Maintenance.** Extensive efforts went into building the supply components of the model. It is proposed that the USGS assume responsibility for maintaining the resource assessments and supply curves in the model as updates become available.

Gas and Power Demand Data Collection and Reporting for Industrial Processes and Power Generation

- **EIA Surveys.** The EIA should conduct two annual surveys, one for power generation and one for industrial applications. These surveys should target the underlying attributes of the industry's physical ability to switch fuel and its actual practice in switching. Units that can switch should be categorized. For example, the EIA should modify its Form 860 to:

  - Reflect most recent date any alternate fuel was consumed for purposes other than testing and which of the listed fuels was consumed

  - Indicate whether alternate fuel usage is limited by permit; and if so, the approximate number of hours capable of being used annually

  - Specify oil storage capability and average inventory when it is categorized as the alternate fuel.

- **North American Reliability Council Reliability Assessments.** The North American Reliability Council should add natural gas supply issues to its regional assessments for reliability purposes.

  - Alternate fuel capabilities should be identified and reported.

  - Gas-fired only capacity should be identified as to percentage of megawatt capacity with firm transportation contracted.

LNG Global Assessment

Given the importance of LNG in North America's natural gas future, DOE should sponsor a follow-on study to assess the worldwide market dynamics for LNG, and the inter-relationships with North American supply and demand. Work should focus on developing a better understanding of the resource bases, prospects for development of various overseas supplies, cost competitiveness, and the possible role for government policies to encourage market-driven development. The LNG summit planned by DOE for this fall would be an appropriate starting point for such an effort, which should aim for a Fall 2004 delivery.